

APPLICATION GUIDE



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MWC/MRC

WATER COOLED CHILLER & HEAT PUMP /
CONDENSERLESS LIQUID CHILLER

180 - 720 kW

MWC-AGU-1901-E



www.lennoxemea.com



MWC - MRC

APPLICATION GUIDE

Ref : MWC-AGU-1901-E

1. RANGE DESCRIPTION

Features and benefits	2
Options and accessories	4
Model number description	5

2. GENERAL DATA

General data	6
Pressure drops	12
Hydraulic data	13
Acoustic data	14
Operating limits	15

4. ELECTRICAL DATA

Electrical tables	16
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5. PERFORMANCES

MWC - Cooling mode	17
MRC - Cooling mode	18
MWC - Heating mode	19

6. DIMENSIONAL DATA

Dimensional data	20
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Product designed and manufactured under quality management systems certified ISO 9001 and ISO 14001.



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Water cooled liquid chiller for indoor installation



GENERAL CHARACTERISTICS OF THE UNIT

The MWC unit is designed for industrial and commercial applications where customers require reduced

total cost of ownership for new air conditioning equipment.

As main characteristics, the MWC unit offers multi scroll R410A compressors with two circuits for safety operation and oversized heat exchangers for high part load energy performances :

- Average $\eta_{s,c}$ / SEER= 230% / 5.95
- Average $\eta_{s,h}$ / SCOP = 215% / 5.55 (A+++ class)
- Average SEPR HT = 7
- Average SEPR MT = 4.15

The MWC is the solution for indoor installation. Thanks to very compact dimensions and limited footprint MWC can be installed easily into any technical room.

The MWC is available in 2 main versions to meet all customer requirements and applications :

- MWC version is the water-cooled chiller. This version can be used for air conditioning applications in association with a separate dry-cooler or using ground water. The MWC version can also be used for heating applications. With the "hot water set point control" option the MWC range can supply hot water up to +56°C.
- MRC version is the split version without condenser. This version can be used for air conditioning applications in association with a remote air-cooled condenser

REFRIGERANT CIRCUIT

MWC is using R410A refrigerant in 2 independent circuits that allows operation at 50% of the capacity in case of issue on one circuit.

Each circuit includes:

- A refrigerant charge reduced by 30% thanks to the use of R410A combined with plate heat exchanger
- Suction piping with thermal insulation.
- Moisture sight glass
- Filter drier with removable cartridge filter.
- Electronic expansion valve.
- Temperature sensors and pressure transducers.
- Leak-tight refrigerant circuit with brazing carried out under nitrogen by certified technicians.
- Each refrigerant circuit is pressure and leak tested with a Hydrogen/Nitrogen mixture, and vacuumed before being charged with refrigerant. All units are then subjected to a complete functional and operational run test to guarantee perfect sealing before leaving the factory.

COMPRESSOR

MWC is using R410A vibration-free compliant® scroll compressors to guarantee a low operating sound level, a high durability and reliability and no maintenance.

- Exclusive Compliant® Scroll design with both axial and radial compliance to increase compressor operation tolerance to liquid refrigerant, substantially improving durability and reliability.
- Motor cooled by suction gas.
- Electronic control of the compressor discharge temperature.
- Motor protection device against high temperature or over current situations.
- Discharge non-return valve.
- Compressors assembly installed on an independent chassis supported by anti-vibration mountings.
- Optional sound-proofed panel enclosures to reduce noise emissions.

WATER HEAT EXCHANGER (EVAPORATOR AND CONDENSER)

MWC is using stainless steel brazed plate heat exchangers with true dual circuit.

- Copper brazed stainless steel plate heat exchanger.
- 13 mm closed cell thermal foam insulation.
- Evaporator protected against freezing risks thanks to a paddle flow switch
- Condenser protected against low condensing temperature thanks to a 0-10 V output signal available from the controller to control a condenser water inlet valve (Not from Lennox supply).

CASING/CHASSIS

- Chassis made of galvanised steel sheet metal painted with a powdered polyester paint (grey).
- Optional casing with removable panels made of galvanised steel sheet metal painted with a powdered polyester paint (grey).



ELECTRICAL BOX

The MWC is designed for 400V/3/50Hz supply.

- Unit electrical cabinet, components and wiring in compliance with EN 60204-1 electrical directive.
- 400V/3/50Hz power supply (without neutral) with a single point of power connection.
- IP24 protection class.
- Recognized brand electrical components for ease of maintenance.
- Main on/off switch mounted on the front panel.
- **DC Advanced** user interface mounted on the front panel.
- 400/24 V transformer to supply the control circuit.
- Labelled electrical wires to facilitate maintenance and diagnostic.
- Optional power and control circuit for the pumps.

CONTROL

The MWC/MRC range is equipped with the latest generation eCLIMATIC controller.

The eCLIMATIC control system is designed to offer the best seasonal energy efficiencies throughout the unit's service life while ensuring reliable operation, with user-friendly interfaces.

This control system offers numerous possibilities. The main functions are as follows:

- 4 scheduling time zones per day over 7 days to allow energy consumption management according to the building use and environmental constraints.
- PI control of the water temperature with operating time equalisation of the compressors.
- Intelligent advanced control algorithm to protect the compressors against excessive short-cycling and to allow operation of the unit without buffer tank in most comfort air conditioning applications (e.g. unit with fan-coils). Refer to minimum installation water loop volume recommendations.
- Water pump control with operating time equalization and automatic change-over in case of a pump fault (Twin pump only).
- Master/slave or cascade control of two chillers operating in parallel with operating time equalization and automatic change-over in case of a unit fault.

eCLIMATIC is pre-factory configured with default settings allowing a fast commissioning on site. The **DC Advanced** user interface with graphical display is easy to use, intuitive. Main customer parameters can be read or modified without main power shut-off (Entering/leaving water temperatures, alarms, water set-points, high and low pressure readings).

The **DS** service display (optional) is a "plug and play" controller that allows service people to read and modify all unit parameters (Unit settings, operating time and number of compressor starts, low and high pressure reading, read the history of last 32 faults...).

COMMUNICATION

The control board is equipped with a RS485 serial communication port to allow remote management through communication bus. According to the wished communication protocol, our control board can be fitted with ModBUS®, LonWorks® or BacNET® communication interface (options).

The main control board has free dry contacts that allow remote control of the unit by wired cable:

- Remote on/off of the unit.
- Remote alarm reset to re-start the unit.
- Alarm or alert indications.
- Free customer contact.

Remote control: additional client inputs/outputs

An expansion card is available with 10 universal inputs (NTC, 4/20mA, TOR dry contact) and 6 additional logic outputs.

Each input/output can be parameterized to **allow remote control of the installation.**

STANDARDS: OVERVIEW

The unit is manufactured in compliance with the European standards and directives:

- Pressure equipment, 2014/68/EU
- Machinery Directive 2006/42/EC
- Low voltage, 2014/35/EU
- Electromagnetic compatibility, 2014/30/EU
- Environment and safety, EN 378-2
- Use of certain hazardous substances (ROHS), 2011/65/EU
- WEEE, 2012/19/EU
- F-gas on fluorinated green-house gases, EU 517/2014
- Substances that deplete the ozone layer, EC 1005/2009
- Energy-related products: Ecodesign, 2009/125/EC :
 - EU 2016/2281 on space cooling
 - EU 2015/1095 on process cooling units
 - EU 813/2013 on space heaters



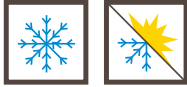
OPTIONS	DESCRIPTION	ADVANTAGES	MODELS
Control/Power electrical equipment of single evaporator pump	Unit equipped with electrical power and control circuit for one single speed pump	Quick start-up on job site.	MWC/MRC 180 ▶ 720
Control/Power electrical equipment of dual evaporator pump	Unit equipped with electrical power and control circuit for dual single speed pumps.	Quick start-up on job site.	MWC/MRC 180 ▶ 720
Control/Power electrical equipment of single condenser pump	Unit equipped with electrical power and control circuit for one single speed pump	Quick start-up on job site.	MWC 180 ▶ 720
Control/Power electrical equipment of dual condenser pump	Unit equipped with electrical power and control circuit for dual single speed pumps.	Quick start-up on job site.	MWC 180 ▶ 720
Evaporator filter (supplied loose)	1000 microns water filter delivered with piping and Victaulic connections.	This protection must be fitted to protect the evaporator from any possible impurities.	MWC/MRC 180 ▶ 720
Condenser filter (supplied loose)	1000 microns water filter delivered with piping and Victaulic connections.	This protection must be fitted to protect the condenser from any possible impurities.	MWC 180 ▶ 720
Evaporator flange connections (supplied loose)	Two connection sleeves with Victaulic groove and flange on opposite side.	Allow easy connection with flanges on customer side.	MWC/MRC 180 ▶ 720
Condenser flange connections (supplied loose)	Two connection sleeves with Victaulic groove and flange on opposite side	Allow easy connection with flanges on customer side.	MWC 180 ▶ 720
Hot water set-point control (Heat pump mode)	Unit equipped with insulated heat exchanger and hot water sensor on condenser side for heating purpose.	Allow heat pump operation.	MWC 180 ▶ 720
DM remote display (supplied loose)	The optional "DM Multi" remote display has the same design and the same advanced functions as the "DC Advanced" display on the front.	It offers the following additional functions: <ul style="list-style-type: none"> • remote connection up to 500 m, • wall mounting, • ability to manage up to 8 units with a single display, the units must be connected to the master/slave bus.. 	MWC/MRC 180 ▶ 720
Service display (supplied loose)	Allows the technical service or maintenance personnel to adjust, read and modify all parameters of the unit.	Specifically for the experts.	MWC/MRC 180 ▶ 720
Modbus communication interface	Communication card using ModBus/JBus protocol	Communication interface with a building management system.	MWC/MRC 180 ▶ 720
LonWorks® communication interface	Communication card using LonTalk® protocol.	Communication interface with a building management system.	MWC/MRC 180 ▶ 720

OPTIONS	DESCRIPTION	ADVANTAGES	MODELS
BACnet® communication interface	Communication card using Bacnet® protocol.	Communication interface with a building management system.	MWC/MRC 180 ▶ 720
Remote control: additional client inputs/ outputs	An expansion card is available with 10 universal inputs (NTC, 4/20mA, TOR dry contact) and 6 additional logic outputs.	Each input/output can be set to allow remote control of the installation.	MWC/MRC 180 ▶ 720
Anti-vibration mounts (supplied loose)	Rubber anti-vibration mounts to be mounted under the unit.	Reduction of the transmission of vibration to the ground.	MWC/MRC 180 ▶ 720
Panel enclosure (compressors)	Unit equipped with removable panels around the compressors to reduce sound level.	Reduction of the unit sound power level.	MWC/MRC 180 ▶ 720
Electrical energy meter	Current transformers (TI) are placed on the customer's power supply cables. They convert the main current into a secondary current (0 to 5 A) sent to an energy meter. The energy meter communicates the following values to the eClimatic system: <ul style="list-style-type: none"> • active power at the time t in kW, • power factor (cos phi), • total active energy meter in kWh. 	These values are displayed on the energy meter and forwarded to the display on the front as well as the remote and service displays. They can be forwarded to a GTC via Modbus or BACnet (RS485 or TCP/IP) or LonWorks communication and made available on our LennoxCloud remote monitoring system.	MWC/MRC 180 ▶ 720
Phase protection	The phase controller is recommended when the power supply is unreliable or unstable, or when using an emergency generator.	It protects the components of the unit against overvoltage, undervoltage or phase failure (phase reversal or loss).	MWC/MRC 180 ▶ 720

MODEL NUMBER DESCRIPTION

EXAMPLE : MWC 200D

M	Medium
W	W = Water cooled R = Remote condenser
C	C = Cooling mode
200	Cooling capacity in kW
D	Number of circuits : D = 2 circuits
N	Non ducted
M	R410 A refrigerant
2	Revision number
M	400V/3/50 Hz


Cooling only and heat pump modes
R410A
MWC

MWC		180	230	280	330	380
Cooling mode						
Cooling capacity ⁽¹⁾	kW	179,9	232,1	279,7	332,7	379,1
Total absorbed power		40,9	51,6	61,6	73,4	83,9
EER ⁽¹⁾		4,40	4,50	4,54	4,53	4,52
Comfort applications	Seasonal Energy Efficiency Ratio ⁽²⁾ SEER	5,64	5,80	5,89	5,85	6,10
	Seasonal energy efficiency ⁽³⁾ η_{s,c}	218	224	227	226	236
Process applications	Seasonal Energy Process Ratio ⁽⁴⁾ SEPR - High temperature (7°C)	7,26	6,95	6,94	6,94	6,92
	Seasonal Energy Process Ratio ⁽⁵⁾ SEPR - Medium temperature (-8°C)	4,16	4,21	4,18	4,19	4,15
Heating mode						
Heating capacity ⁽¹⁾	kW	198,8	254,9	307,1	364,0	415,6
Total absorbed power		49,9	63,0	74,9	89,0	101,7
COP ⁽¹⁾		3,98	4,05	4,10	4,09	4,09
Comfort applications	Seasonal Coefficient of Performance ⁽⁶⁾ SCOP	5,49	5,69	5,57	5,60	5,65
	Seasonal energy efficiency ⁽⁷⁾ η_{s,h}	212	220	215	216	218
	Seasonal energy efficiency class ⁽⁸⁾	A+++				
Refrigeration circuit						
Number of circuit		2	2	2	2	2
Total refrigerant load	kg	16	24	28	28	44
Type of expansion valve		Electronic expansion valve				
Compressors						
Number of compressors		4	4	4	4	4
Type of compressor		Scroll - Hermetic				
Capacity steps		20-50-75-100%	21-43-62-83-100%	21-36-53-71-85-100%	15-46-61-87-100%	25-50-75-100%
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF				
Oil load per compressor	l	(2 x 3,2) + (2 x 3,2)	(3,2+6,3) + (2 x 3,2)	(3,2+6,3) + (3,2+6,3)	(2 x 6,3) + (3,2+6,3)	(2 x 6,3) + (2 x 6,3)
Condenser (heating mode)						
Type of condenser		AISI 304 stainless steel plate brazed with copper heat exchanger				
Number of condenser		1				
Water flow rate	m ³ /h	37,7	48,5	58,4	69,4	79,1
Water volume	l	13	24	35	35	43
Pressure drop	kPa	46	40	32	44	43
Water operating pressure		600				

(1) EUROVENT certified data, in accordance with standard EN 14511 :

Cooling mode

Evaporator water temperature = 12/7°C
Condenser water temperature = 30/35°C

Heating mode

Condenser water temperature = 40/45°C
Evaporator water inlet temperature = 10 °C
Evaporator water outlet temperature calculated with the same water flow as in cooling mode.

(2) SEER in accordance with standard EN14825.

(3) Following ecodesign regulation EU **2016/2281** on space cooling, normalized leaving water temperature at 7°C, in accordance with standard EN 14825.

(4) Following ecodesign regulation EU **2016/2281** on process cooling units, normalized leaving water temperature at 7°C, in accordance with standard EN 14825.

(5) Following ecodesign regulation EU **2015/1095** on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN 14825

(6) SCOP in accordance with standard EN 14825. Heating mode performance is defined for average climate conditions.

(7) Following ecodesign regulation EU **813/2013** on space heaters, normalized leaving water temperature at 7°C, in accordance with standard EN 14825, average climate conditions.

(8) Following energy labelling regulation EU **811/2013** on space heaters.


Cooling only and heat pump modes


MWC		180	230	280	330	380
Evaporator (cooling mode)						
Type of evaporator		AISI 304 stainless steel plate brazed with copper heat exchanger				
Number of evaporators		1				
Water flow rate ⁽¹⁾	m ³ /h	31,0	39,9	48,2	57,2	65,3
Water volume	l	13	24	24	35	35
Pressure drop ⁽¹⁾	kPa	33	29	40	31	40
Maxi. water operating pressure		600				
Hydraulic connections		Victaulic				
Water inlet / outlet		4"				
Electrical data						
Power supply		400V/III/50Hz				
Starting current ⁽²⁾		272,0	408,0	435,0	463,0	490,0
Maximum current ⁽²⁾		129,0	158,0	184,0	212,0	240,0

(1) EUROVENT certified data, in accordance with standard EN 14511.

Cooling mode :

Evaporator water temperature = 12/7°C
 Condenser water temperature = 30/35°C

Heating mode :

Condenser water temperature = 40/45°C
 Evaporator water inlet temperature = 10 °C
 Evaporator water outlet temperature calculated with the same water flow as in cooling mode

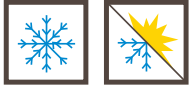
(2) At maximum compressor load.

Acoustic data

MWC		180	230	280	330	380
Global sound power level	dB(A)	81,6	87,1	89,4	90,9	92,0

Dimensional data

MWC		180	230	280	330	380
Length	mm	2150				
Width		820				
Height		1645	1870	1870	1870	1870
Footprint	m ²	1,8				
Shipping Weight	kg	736	914	1088	1248	1444
Operating Weight		756	974	1158	1328	1534


Cooling only and heat pump modes


MWC		450	510	570	650	720
Cooling mode						
Cooling capacity ⁽¹⁾	kW	432,7	482,2	551,3	620,5	691,9
Total absorbed power		98,3	112,8	127,2	145,3	166,1
EER ⁽¹⁾		4,40	4,27	4,33	4,27	4,17
Comfort applications	Seasonal Energy Efficiency Ratio ⁽²⁾ SEER	6,14	6,04	6,11	5,96	5,89
	Seasonal energy efficiency ⁽³⁾ η_{s,c}	238	233	237	231	227
Process applications	Seasonal Energy Process Ratio ⁽⁴⁾ SEPR - High temperature (7°C)	-	-	-	-	-
	Seasonal Energy Process Ratio ⁽⁵⁾ SEPR - Medium temperature (-8°C)	4,11	4,08	4,16	4,21	4,20
Heating mode						
Heating capacity ⁽¹⁾	kW	477,0	536,4	609,6	689,0	758,6
Total absorbed power		119,2	136,7	154,0	174,0	196,9
COP ⁽¹⁾		4,00	3,92	3,96	3,96	3,85
Comfort applications	Seasonal Coefficient of Performance ⁽⁶⁾ SCOP	5,70	5,52	5,62	5,43	5,26
	Seasonal energy efficiency ⁽⁷⁾ η_{s,h}	220	213	217	209	203
	Seasonal energy efficiency class ⁽⁸⁾	A+++				
Refrigeration circuit						
Number of circuit		2	2	2	2	2
Total refrigerant load	kg	54	58	62	60	60
Type of expansion valve		Electronic expansion valve				
Compressors						
Number of compressors		6	6	6	6	6
Type of compressor		Scroll - Hermetic				
Capacity steps		18-36-53-70-85-100%	16-37-51-70-83-100%	18-36-53-70-85-100%	16-37-52-70-83-100%	18-37-53-70-85-100%
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF				
Oil load per compressor	l	(3x6,8) + (3x6,8)	(3x6,8) + (3x6,3)	(3x6,3) + (3x6,3)	(3x6,3) + (3x6,3)	(3x6,3) + (3x6,3)
Condenser (heating mode)						
Type of condenser		AISI 304 stainless steel plate brazed with copper heat exchanger				
Number of condenser		1				
Water flow rate	m ³ /h	90,7	101,6	115,8	130,9	146,6
Water volume	l	52	56	61	77	77
Pressure drop	kPa	39	43	52	28	33
Water operating pressure		600				

(1) EUROVENT certified data, in accordance with standard EN 14511 :

Cooling mode

Evaporator water temperature = 12/7°C
Condenser water temperature = 30/35°C

Heating mode

Condenser water temperature = 40/45°C
Evaporator water inlet temperature = 10 °C
Evaporator water outlet temperature calculated with the same water flow as in cooling mode.

(2) SEER in accordance with standard EN14825.

(3) Following ecodesign regulation EU **2016/2281** on space cooling, normalized leaving water temperature at 7°C, in accordance with standard EN 14825.

(4) Following ecodesign regulation EU **2016/2281** on process cooling units, normalized leaving water temperature at 7°C, in accordance with standard EN 14825.

(5) Following ecodesign regulation EU **2015/1095** on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN 14825

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(7) Following ecodesign regulation EU **813/2013** on space heaters, normalized leaving water temperature at 7°C, in accordance with standard EN 14825, average climate conditions.

(8) Following energy labelling regulation EU **811/2013** on space heaters.


Cooling only and heat pump modes


MWC		450	510	570	650	720
Evaporator (cooling mode)						
Type of evaporator		AISI 304 stainless steel plate brazed with copper heat exchanger				
Number of evaporators		1				
Water flow rate ⁽¹⁾	m ³ /h	74,5	83,1	94,9	106,9	99,2
Water volume	l	43	43	61	61	61
Pressure drop ⁽¹⁾	kPa	39	47	43	54	47
Maxi. water operating pressure		600				
Hydraulic connections		Victaulic				
Water inlet / outlet		5"				
Electrical data						
Power supply		400V/III/50Hz				
Starting current ⁽²⁾	A	499,0	565,0	609,0	736,0	779,0
Maximum current ⁽²⁾		272,0	314,0	358,0	402,0	445,0

(1) EUROVENT certified data, in accordance with standard EN 14511.

Cooling mode :

Evaporator water temperature = 12/7°C
 Condenser water temperature = 30/35°C

Heating mode :

Condenser water temperature = 40/45°C
 Evaporator water inlet temperature = 10 °C
 Evaporator water outlet temperature calculated with the same water flow as in cooling mode

(2) At maximum compressor load.

Acoustic data

MWC		450	510	570	650	720
Global sound power level	dB(A)	92,8	93,3	93,8	96,1	97,7

Dimensional data

MWC		450	510	570	650	720
Length	mm	2200				
Width		1200				
Height		1870				
Footprint	m ²	2,6				
Shipping Weight	kg	1894	1990	2110	2270	2310
Operating Weight		1984	2100	2240	2440	2480

COOLING ONLY
R410A
MRC

MRC		180	230	280	330	380
Cooling mode						
Cooling capacity ⁽¹⁾	kW	161,1	202,0	241,9	288,7	328,5
Total absorbed power ⁽¹⁾		49,7	63,0	76,2	89,4	102,5
EER		3,24	3,21	3,18	3,23	3,20
Refrigeration circuit						
Number of circuit		2				
Capacity per circuit C1/C2	%	50-50%	60-40%	50-50%	57-43%	50-50%
Type of expansion valve		Electronic expansion valve				
Compressors						
Number of compressors		4	4	4	4	4
Type of compressor		Scroll - Hermetic				
Capacity steps	%	25-50- 75-100%	21-43-62- 83-100%	21-36-53- 71-85-100%	15-46-61- 87-100%	25-50- 75-100%
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF				
Oil load per compressor	l	(2 x 3,2) + (2 x 3,2)	(3,2 + 6,3) + (2 x 3,2)	(3,2 + 6,3) + (3,2 + 6,3)	(2 x 6,3) + (3,2 + 6,3)	(2 x 6,3) + (2 x 6,3)
Refrigerant connections						
Liquid line		7/8"	1" 1/8 - 7/8"	2 x 1" 1/8	2 x 1" 1/8	2 x 1" 1/8
Discharge line		1" 1/8	1" 3/8 - 1" 1/8	2 x 1" 3/8	2 x 1" 3/8	2 x 1" 3/8
Evaporator						
Type of evaporator		AISI 316 stainless steel plate brazed with copper heat exchanger				
Number of evaporator		1				
Water flow rate ⁽¹⁾		27,7	34,8	41,6	49,7	56,5
Water volume	l	13	24	24	35	35
Water operating pressure	kPa	600				
Hydraulic connections						
Water inlet/outlet		4"	4"	4"	4"	4"
Electrical data						
Power supply		400V / III / 50Hz				
Starting current	A	272,0	408,0	435,0	463,0	490,0
Maximum current		129,0	158,0	184,0	212,0	240,0

All data are at Eurovent conditions :

(1) Gross cooling capacity with 12/7°C water temperature

(*) Except for MWC 720 : 13/7°C evaporator water temperature.

Acoustic data

MRC		180	230	280	330	380
Global sound power level	dB(A)	81	87	89	90	92

Dimensional data

MRC		180	230	280	330	380
Length	mm	2200				
Width		1200				
Height		1870				
Footprint	m ²	2,6				
Shipping Weight	kg	620	770	910	1080	1240
Operating Weight		650	810	950	1120	1290

COOLING ONLY



MRC		450	510	570	650	720 (*)
Cooling mode						
Cooling capacity ⁽¹⁾	kW	382,0	432,8	494,3	554,8	615,4
Total absorbed power ⁽¹⁾		120,3	137,0	153,8	176,2	198,6
EER		3,18	3,16	3,21	3,15	3,10
Refrigeration circuit						
Number of circuit		2				
Capacity per circuit C1/C2	%	50-50%	56-44%	50-50%	55-45%	50-50%
Type of expansion valve		EEV ⁽²⁾	TEV ⁽²⁾	TEV ⁽²⁾	EEV ⁽²⁾	EEV ⁽²⁾
Compressors						
Number of compressors		6	6	6	6	6
Type of compressor		Scroll - Hermetic				
Capacity steps	%	18-36-53-70-85-100%	16-37-51-70-83-100%	18/36-53-70-85-100%	16-37-52-70-83-100%	18-37-53-70-85-100%
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF				
Oil load per compressor	l	(3 x 6,8) + (3 x 6,8)	(3 x 6,8) + (3 x 6,3)	(3 x 6,3) + (3 x 6,3)	(3 x 6,3) + (3 x 6,3)	(3 x 6,3) + (3 x 6,3)
Refrigerant connections						
Liquid line		2 x 1" 3/8"	2 x 1" 3/8"	2 x 1" 3/8"	1" 5/8 - 1" 3/8	2 x 1" 5/8"
Discharge line		2 x 1" 5/8	2 x 1" 5/8	2 x 1" 5/8	2" 1/8 - 1" 5/8	2 x 2" 1/8
Evaporator						
Type of evaporator		AISI 316 stainless steel plate brazed with copper heat exchanger				
Number of evaporator		1				
Water flow rate ⁽¹⁾		65,7	74,5	85,0	95,5	105,9
Water volume	l	43	43	61	61	61
Water operating pressure	kPa	600				
Hydraulic connections						
Water inlet/outlet		Victaulic				
Water inlet/outlet		5"				
Electrical data						
Power supply		400V / III / 50Hz				
Starting current	A	499,0	565,0	609,0	736,0	779,0
Maximum current		272,0	314,0	358,0	402,0	445,0

All data are at Eurovent conditions :

(1) Gross cooling capacity with 12/7°C water temperature

(*) Except for MWC 720 : 13/7°C evaporator water temperature.

(2) EEV = Electronic expansion valve

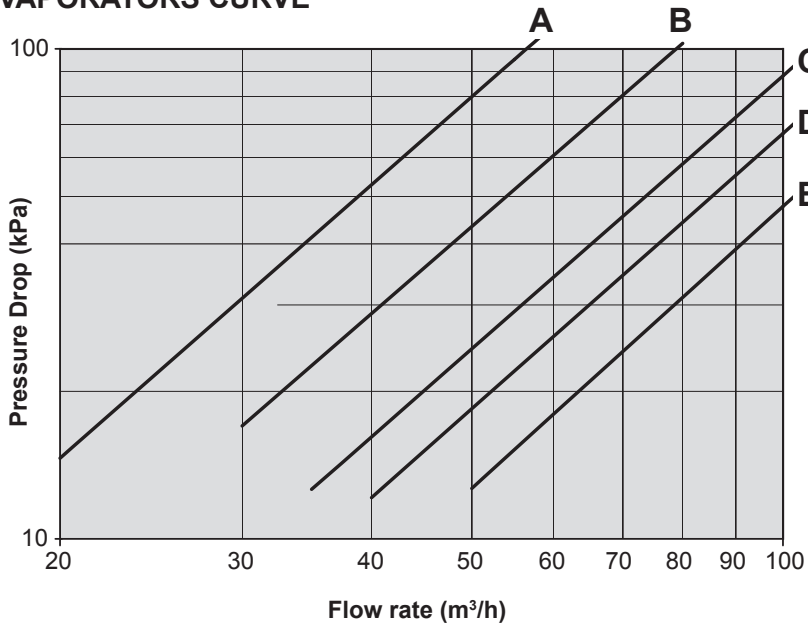
TEV = Thermostatic expansion valve

Acoustic data

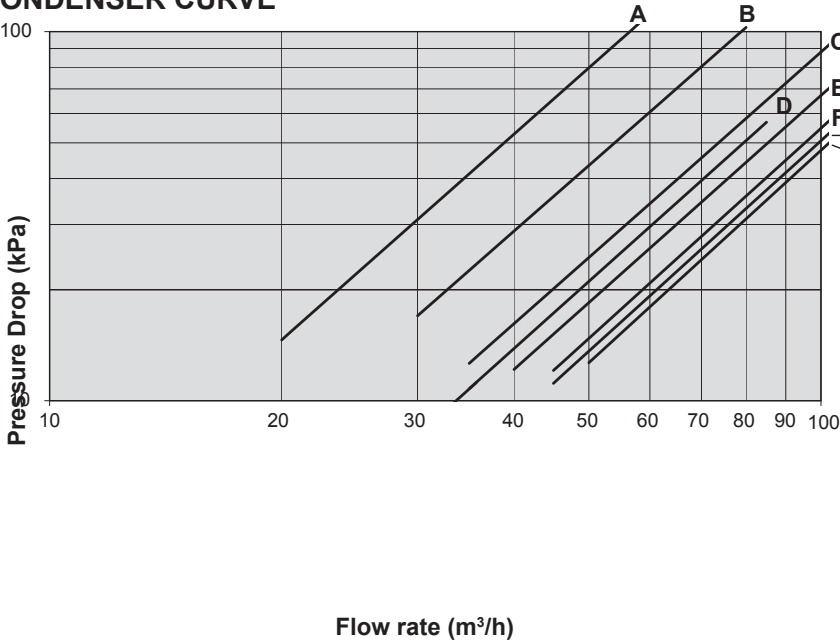
MRC		450	510	570	650	720 (*)
Global sound power level	dB(A)	92,8	93,3	93,8	96,1	97,7

Dimensional data

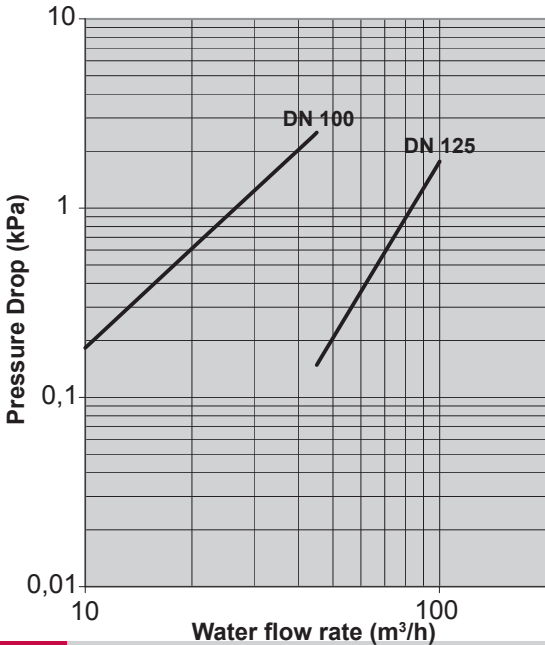
MRC		450	510	570	650	720 (*)
Length	mm	2200				
Width		1200				
Height		1870				
Footprint	m ²	2,6				
Shipping Weight	kg	1620	1690	1790	1890	1930
Operating Weight		1660	1740	1870	1980	2020

EVAPORATORS CURVE


	Curves
MWC/MRC 180	A
MWC/MRC 230	B
MWC/MRC 280	B
MWC/MRC 330	C
MRC 380	C
MRC 450	D
MRC 510	D
MRC 570	E
MRC 650	E
MRC 720	E

CONDENSER CURVE


	Curves
MWC/MRC 180	A
MWC/MRC 230	B
MWC/MRC 280	C
MWC/MRC 330	C
MRC 380	D

FILTER CURVE


MWC	Curve
MWC/MRC 180	DN100
MWC/MRC 230	DN100
MWC/MRC 280	DN100
MWC/MRC 330	DN100
MRC 380	DN100
MRC 450	DN125
MRC 510	DN125
MRC 570	DN125
MRC 650	DN125
MRC 720	DN125

Pressure drops are given for information only. A tolerance of +/- 20kPa must be considered when selecting water pumps.

MINIMUM WATER CONTENT OF AN INSTALLATION

Thanks to multi step capacity control and smart anti-short compressor cycling, MWC can work with minimum water loop volume as defined here below. This can eliminate the need for a buffer tank in most of air-conditioning applications (e.g. MWC application with fan-coil units). :

$$V_{\text{mini}} = 86 \times Q / (N_{\text{stages}} \times Dt)$$

Where :	V	Minimum water content of the installation
	Q	Cooling capacity of the chiller
	Nstage	Number of control steps available in the unit
	Dt	Maximum acceptable temperature rise (Dt = 6°C for an air conditioning application)

Important note: In case MWC is used in air-conditioning applications with a short water system (e.g. MWC application with air handling units) or in case MWC is used for industrial process cooling, it is mandatory to use a buffer tank.

MINIMUM WATER CONTENT OF AN INSTALLATION

Unit Size	Number of stages	Mini water volume (l)
MWC / MRC 180	4	645
MWC / MRC 230	5	659
MWC / MRC 280	6	669
MWC / MRC 330	5	946
MWC / MRC 380	4	1362
MRC 450	6	1075
MRC 510	6	1218
MRC 570	6	1362
MRC 650	6	1553
MRC 720	6	1720

Note : The volume of the condenser water loop has no impact on the chiller operation. In heat pump operation (with hot water set point control option) the minimum volume of the condenser water loop must be calculated based on the heating capacity using the same formula.

GLYCOL CORRECTION FACTOR

Minimum ambient temperature or water outlet temperature	Ethylene glycol	Pressure drop	Water flow	CAPACITIES	
				Cooling	Heating
+ 5°C ► 0°C	10%	1,05	1,02	0,99	0,994
0°C ► -5°C	20%	1,10	1,05	0,98	0,993
- 5°C ► -10°C	30%	1,15	1,08	0,97	0,99
- 10°C ► -15°C	35%	1,18	1,10	0,96	0,987

Example : 10% glycol
 Minimum flow : 1,19 m³/h x 1,02
 Pressure drop x 1,07
 System capacity x 0,99

STANDARD UNIT

MWC

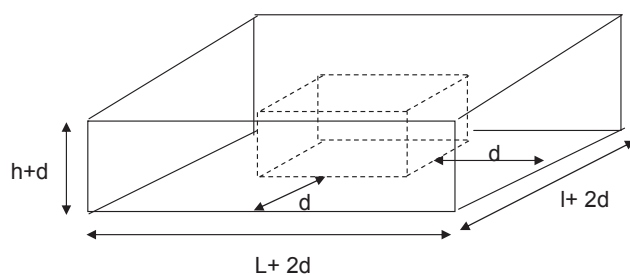
		Spectrum per octave band dB(A)						Global sound power EUROVENT Lwa dB(A)	Sound pressure at 10 m. Semi-spheric (1) Lp dB(A)	Sound pressure envelopping surface at 10 m. (2) Lp dB(A)	
		125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz				8000 Hz
MWC/MRC	180	38	57	70	78	78	70	65	81	54	50
	230	44	67	74	82	84	77	69	87	59	56
	280	46	70	76	84	87	80	71	89	61	58
	330	48	71	78	85	88	81	73	90	63	60
	380	49	72	79	86	89	82	74	92	64	61
MRC	450	50	73	79	87	90	83	75	92	65	62
	510	50	74	80	88	91	84	75	93	65	62
	570	51	74	80	88	91	84	76	93	66	63
	650	55	73	81	91	94	86	76	96	68	65
	720	57	71	81	93	95	87	75	97	70	66


UNIT WITH PANEL ENCLOSURE (OPTION)

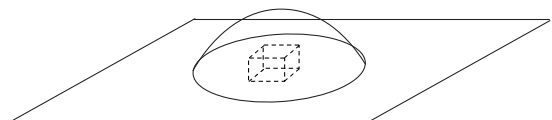
		Spectrum per octave band dB(A)						Global sound power EUROVENT Lwa dB(A)	Sound pressure at 10 m. Semi-spheric (1) Lp dB(A)	Sound pressure envelopping surface at 10 m. (2) Lp dB(A)	
		125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz				8000 Hz
MWC/MRC	180	39	53	65	67	66	58	53	71	43	40
	230	44	69	71	72	74	67	57	78	50	47
	280	46	72	74	75	77	70	59	80	53	50
	330	47	74	75	76	78	71	61	82	55	51
	380	48	75	76	77	79	73	62	83	56	52
MRC	450	49	76	77	78	80	73	63	84	56	53
	510	50	76	78	79	81	74	63	85	57	54
	570	50	77	78	79	81	74	64	85	57	54
	650	54	75	78	82	84	76	63	87	59	56
	720	56	73	78	84	85	78	63	88	60	57

(1) : For information only: data calculated by semi spheric method in free open fiel.

(2) : For information only : data calculated by envelopping surface method in free open field.

Enveloping Surface


$$A = 2(L+2d)(h+d) + 2(l+2d)(h+d) + (L+2d)(l+2d)$$

Semi spheric


$$Lp = Lw - 10 \log 2\pi d^2$$

COOLING ONLY

MWC

MWC		180 ▶ 720
Min. evaporator outlet water temperature	°C	-10
Max. evaporator outlet water temperature	°C	20
Min. difference water inlet/outlet	°C	3
Max. difference water inlet/outlet	°C	8
Min. condenser outlet water temperature	°C	20
Maximum condenser outlet water temperature : Full capacity operation	°C	56

Evaporator and condenser water Delta T = 5°C

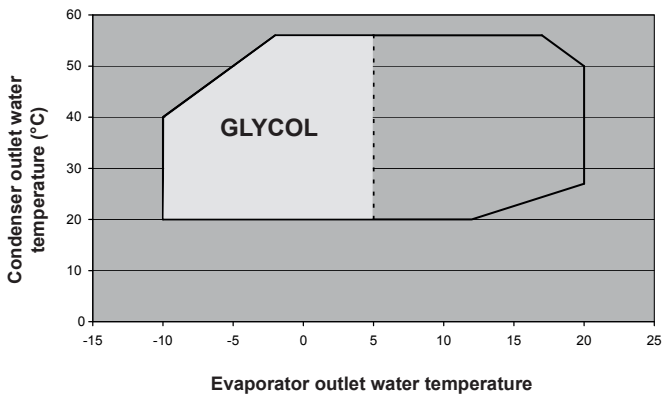
REMOTE CONDENSER

MRC

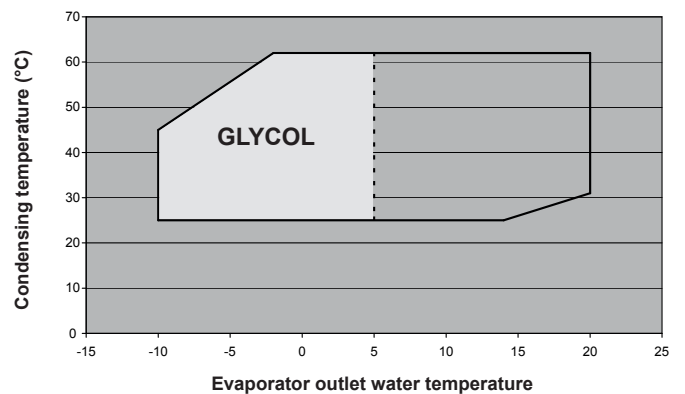
MRC		180 ▶ 720
Min. evaporator outlet water temperature	°C	-10
Max. evaporator outlet water temperature	°C	20
Min. difference water inlet/outlet	°C	3
Max. difference water inlet/outlet	°C	8
Minimum discharge temperature	°C	25
Maximum discharge temperature : Full capacity operation	°C	62

Evaporator water Delta T = 5°C

MWC
Operating limits



MRC
Operating limits



UNITS
MWC/MRC

		MWC/MRC				
		180	230	280	330	380
Minimum and maximum voltage	V	380 V / 420 V				
Maximum power	kW	69,0	88,0	107,0	126,0	145,0
Maximum current	A	129,0	158,0	184,0	212,0	240,0
Maximum current (with cos phi 0,95 option)	A	107,0	136,0	165,0	194,0	222,0
Start-up intensity	A	272,0	408,0	435,0	463,0	490,0
Start-up intensity (with sofstarter option)	A	192,0	275,0	303,0	330,0	358,0
Start-up intensity (with cos phi 0,95 option)	A	160,0	246,0	274,0	303,0	332,0
Maximum connectable power section	mm ²	185	185	185	185	185

		MWC/MRC				
		450	510	570	650	720
Minimum and maximum voltage	V	380 V / 420 V				
Maximum power	kW	166,0	192,0	217,0	244,0	271,0
Maximum current	A	272,0	314,0	358,0	402,0	445,0
Maximum current (with cos phi 0,95 option)	A	250,0	291,0	332,0	374,0	416,0
Start-up intensity	A	499,0	565,0	609,0	736,0	779,0
Start-up intensity (with sofstarter option)	A	359,0	433,0	477,0	549,0	593,0
Start-up intensity (with cos phi 0,95 option)	A	333,0	401,0	442,0	512,0	554,0
Maximum connectable power section	mm ²	300	300	300	300	300

COOLING MODE

MWC		Condenser water outlet temperature																	
		30°C				35°C				40°C				45°C					
		Pf	Pe	Wf	Dp	Pf	Pe	Wf	Dp	Pf	Pe	Wf	Dp	Pf	Pe	Wf	Dp		
		kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa	kW	kW	m³/h	kPa		
Evaporator water outlet temperature	5 °C	180	177,4	36,5	30,9	32,6	169,0	40,6	29,1	29,2	159,4	44,9	27,4	26,2	148,8	49,5	25,6	23,0	
		230	229,2	46,3	39,8	28,6	217,9	51,2	37,5	25,5	205,4	56,7	35,3	22,9	191,7	62,7	32,9	20,2	
		280	275,7	55,5	48,0	40,2	262,3	61,0	45,1	35,9	247,6	67,4	42,6	32,3	231,7	74,5	39,8	28,6	
		330	328,6	66,0	57,1	31,2	311,9	72,5	53,6	27,8	293,9	80,0	50,5	24,9	274,5	88,5	47,2	21,9	
		380	374,3	75,7	65,1	39,8	355,4	82,8	61,1	35,4	335,1	91,2	57,6	31,7	313,2	101,0	53,8	28,0	
		450	426,9	88,6	74,2	38,5	406,0	97,1	69,8	34,3	383,1	107,0	65,8	30,8	358,2	118,3	61,6	27,2	
		510	475,8	101,7	82,8	47,2	452,4	111,4	77,8	42,1	426,8	122,7	73,4	37,7	399,2	135,7	68,6	33,3	
		570	544,5	114,7	94,7	42,9	516,9	125,5	88,9	38,1	487,1	138,2	83,7	34,0	455,2	152,9	78,2	29,8	
		650	612,0	131,8	106,5	53,7	582,5	143,4	100,2	47,9	550,0	157,2	94,6	42,9	514,8	173,0	88,5	37,8	
		720 (*)	682,4	151,1	98,8	46,6	650,1	164,1	93,1	41,6	614,3	179,2	88,0	37,3	574,8	196,5	82,3	32,9	
		7 °C	180	189,0	36,6	32,9	36,8	179,9	40,9	31,0	32,9	169,7	45,3	29,2	29,5	158,4	50,0	27,3	25,9
			230	244,3	46,6	42,5	32,2	232,1	51,6	39,9	28,7	218,7	57,2	37,6	25,8	204,1	63,3	35,1	22,7
280	294,1		56,1	51,2	45,4	279,7	61,6	48,2	40,5	263,9	68,0	45,4	36,4	247,0	75,2	42,5	32,2		
330	350,6		66,9	61,0	35,3	332,7	73,4	57,2	31,4	313,3	80,9	53,9	28,1	292,7	89,4	50,3	24,7		
380	399,4		76,8	69,6	45,0	379,1	83,9	65,3	40,0	357,4	92,3	61,5	35,8	334,1	102,0	57,5	31,6		
450	455,1		89,9	79,3	43,5	432,7	98,3	74,5	38,7	408,2	108,1	70,2	34,7	381,8	119,2	65,7	30,7		
510	507,5		103,3	88,4	53,4	482,2	112,8	83,1	47,5	454,9	124,1	78,3	42,6	425,6	137,0	73,3	37,6		
570	580,9		116,6	101,2	48,7	551,3	127,2	94,9	43,1	519,4	139,9	89,4	38,5	485,4	154,5	83,5	33,8		
650	652,3		133,8	113,7	60,9	620,5	145,3	106,9	54,1	585,9	158,9	100,9	48,5	548,4	174,6	94,4	42,7		
720 (*)	726,6		153,3	105,4	52,7	691,9	166,1	99,2	47,0	653,7	181,1	93,7	42,1	611,8	198,2	87,7	37,1		
8 °C	180		195,0	36,7	34,0	39,1	185,6	41,0	32,0	34,8	175,0	45,5	30,1	31,2	163,4	50,3	28,1	27,5	
	230		252,1	46,8	43,9	34,2	239,5	51,9	41,2	30,5	225,6	57,5	38,8	27,3	210,6	63,6	36,2	24,1	
	280	303,5	56,4	52,9	48,2	288,6	62,0	49,7	42,9	272,4	68,3	46,9	38,6	255,0	75,5	43,9	34,2		
	330	361,9	67,4	63,1	37,5	343,4	73,8	59,1	33,3	323,4	81,3	55,7	29,8	302,1	89,8	52,0	26,3		
	380	412,4	77,4	71,9	47,8	391,4	84,5	67,4	42,5	368,9	92,9	63,5	38,0	344,9	102,5	59,4	33,6		
	450	469,7	90,5	81,9	46,2	446,5	98,9	76,9	41,1	421,3	108,7	72,5	36,9	394,1	119,8	67,8	32,6		
	510	523,8	104,1	91,4	56,8	497,7	113,6	85,8	50,4	469,5	124,8	80,9	45,2	439,3	137,7	75,6	39,9		
	570	599,7	117,6	104,6	51,9	569,0	128,2	98,0	45,9	536,1	140,8	92,3	40,9	501,1	155,4	86,3	35,9		
	650	673,1	134,8	117,4	64,8	640,2	146,3	110,4	57,5	604,4	159,8	104,1	51,5	565,8	175,4	97,5	45,4		
	720 (*)	749,3	154,4	108,8	56,0	713,5	167,1	102,4	49,8	674,0	182,1	96,7	44,7	631,0	199,0	90,5	39,4		
	10 °C	180	207,4	36,8	36,2	43,9	197,3	41,2	34,0	39,1	186,1	45,9	32,1	35,1	173,8	50,8	30,0	30,9	
		230	268,1	47,2	46,8	38,4	254,6	52,3	43,9	34,2	240,0	58,0	41,4	30,6	224,1	64,3	38,6	27,0	
280		323,0	57,1	56,4	54,2	307,0	62,7	53,0	48,2	289,8	69,1	50,0	43,3	271,4	76,3	46,8	38,4		
330		385,3	68,4	67,3	42,3	365,5	74,8	63,0	37,4	344,3	82,3	59,3	33,5	321,8	90,8	55,4	29,5		
380		439,0	78,7	76,7	53,9	416,6	85,7	71,8	47,8	392,7	94,1	67,7	42,8	367,3	103,7	63,3	37,8		
450		499,7	91,9	87,3	52,1	475,0	100,2	81,9	46,3	448,2	109,9	77,3	41,5	419,5	120,9	72,3	36,7		
510		557,3	105,9	97,4	64,0	529,5	115,3	91,3	56,7	499,5	126,4	86,2	50,9	467,6	139,2	80,6	44,9		
570		638,3	119,7	111,5	58,7	605,6	130,2	104,4	51,8	570,6	142,7	98,4	46,2	533,5	157,2	92,0	40,6		
650		715,7	137,0	125,2	73,2	680,6	148,3	117,5	64,8	642,6	161,7	110,9	58,0	601,8	177,2	103,8	51,2		
720 (*)		796,0	156,7	115,9	63,1	757,8	169,3	108,9	56,1	716,0	184,0	102,8	50,3	670,6	200,8	96,3	44,3		
12 °C		180	220,3	37,0	38,6	49,3	209,5	41,5	36,2	43,8	197,6	46,3	34,1	39,3	184,7	51,3	31,9	34,6	
		230	284,7	47,7	49,8	43,1	270,5	52,9	46,7	38,2	254,9	58,6	44,0	34,3	238,2	64,9	41,1	30,3	
	280	343,1	57,8	60,1	60,8	326,2	63,5	56,3	54,0	308,0	69,9	53,2	48,5	288,5	77,1	49,8	43,0		
	330	409,6	69,5	71,7	47,5	388,5	75,9	67,0	42,0	366,1	83,3	63,1	37,6	342,3	91,8	59,0	33,2		
	380	466,7	80,2	81,7	60,6	442,9	87,1	76,5	53,6	417,5	95,3	72,1	48,0	390,7	104,9	67,4	42,4		
	450	530,9	93,5	93,0	58,6	504,7	101,6	87,1	51,9	476,4	111,2	82,2	46,6	446,2	122,1	77,0	41,2		
	510	592,1	107,8	103,7	72,0	562,5	117,1	97,2	63,7	530,8	128,1	91,7	57,1	497,1	140,8	85,8	50,5		
	570	678,3	122,0	118,8	66,2	643,6	132,4	111,1	58,3	606,6	144,8	104,7	52,0	567,5	159,2	97,9	45,8		
	650	759,9	139,3	133,2	82,4	722,7	150,5	124,9	72,9	682,4	163,7	117,9	65,3	639,4	179,0	110,4	57,6		
	720 (*)	844,4	159,2	123,2	71,0	803,9	171,5	115,6	62,9	759,6	186,0	109,2	56,4	711,8	202,6	102,3	49,8		
	14 °C	180	233,6	37,2	41,0	55,2	222,3	41,7	38,4	48,9	209,7	46,7	36,2	43,9	196,1	51,8	33,9	38,8	
		230	302,0	48,2	53,0	48,2	286,9	53,4	49,6	42,7	270,6	59,2	46,7	38,3	253,0	65,6	43,7	33,8	
280		364,0	58,6	63,9	68,1	346,1	64,3	59,8	60,3	326,8	70,7	56,5	54,2	306,4	77,9	52,9	48,1		
330		434,8	70,7	76,3	53,3	412,5	77,0	71,3	47,0	388,8	84,5	67,1	42,1	363,8	92,9	62,8	37,2		
380		495,3	81,7	87,0	68,0	470,1	88,5	81,3	60,0	443,4	96,7	76,6	53,8	415,1	106,2	71,7	47,6		
450		563,4	95,1	98,9	65,8	535,6	103,1	92,6	58,2	505,8	112,6	87,4	52,2	474,1	123,4	81,9	46,3		
510		628,1	109,9	110,3	80,7	596,8	119,0	103,2	71,3	563,4	129,9	97,4	64,0	528,0	142,5	91,2	56,6		
570		719,9	124,6	126,4	74,6	683,1	134,8	118,1	65,5	644,0	147,1	111,3	58,5	602,8	161,4	104,1	51,5		
650		805,7	141,8	141,6	92,7	766,3	152,7	132,6	81,7	723,8	165,9	125,2	73,2	678,6	181,0	117,3	64,7		
720 (*)		894,4	161,7	130,8	79,6	851,6	173,8	122,6	70,4	805,0	188,1	115,9	63,1	754,8	204,5	108,6	55,8		

(*) ΔT evaporator = 5K except for (*) = 6K
 ΔT condenser: 5K

Pf : Net cooling capacity in kW
Pe : Effective absorbed power in cooling mode
Wf : Water flow in m³ per hour
Dp : Water pressure drop in KPa

COOLING MODE

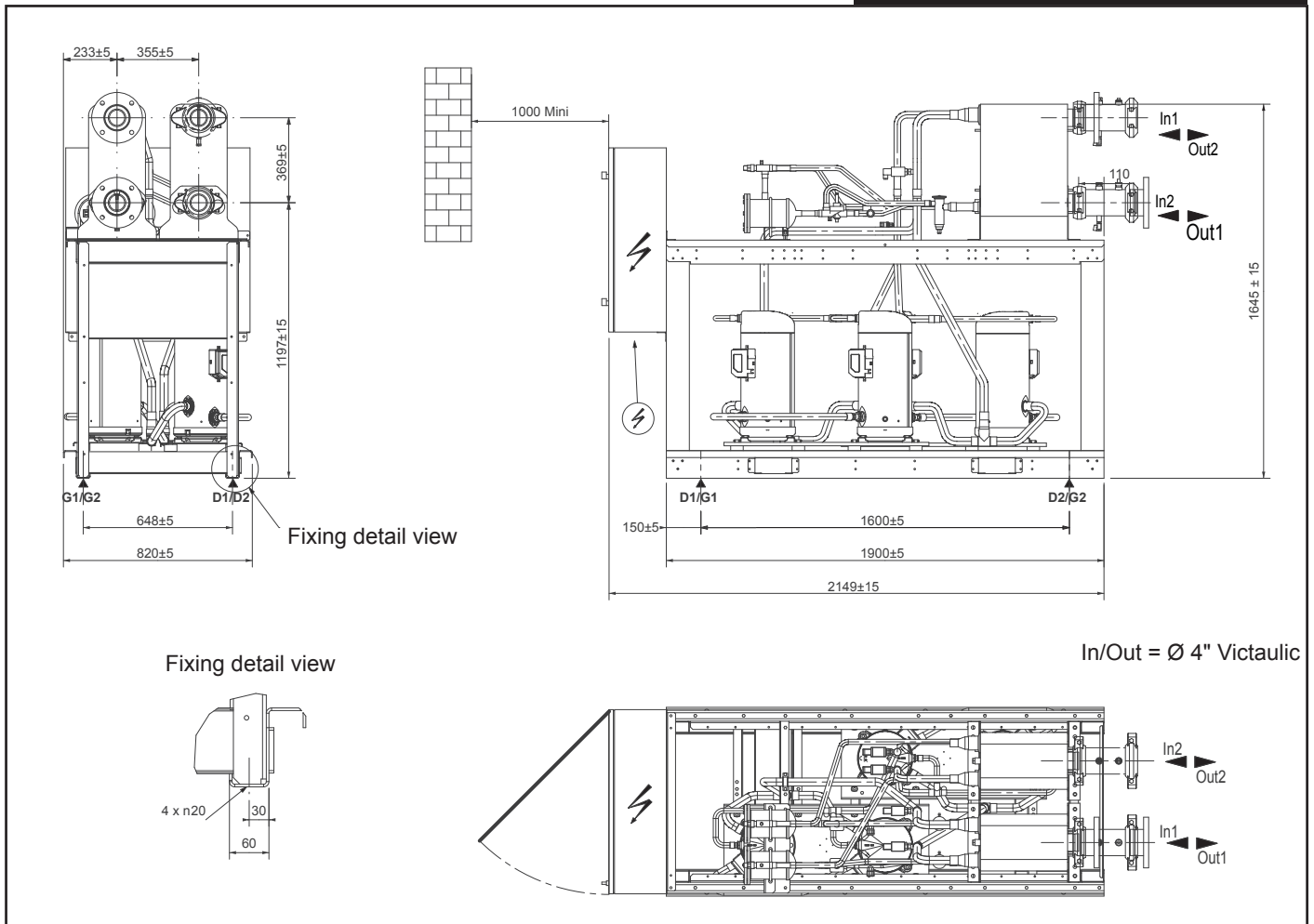
MRC		Saturated discharge temperature																				
		40				45				50				55				60				
		Pf kW	Pe kW	Wf m³/h	Dp kPa	Pf kW	Pe kW	Wf m³/h	Dp kPa	Pf kW	Pe kW	Wf m³/h	Dp kPa	Pf kW	Pe kW	Wf m³/h	Dp kPa	Pf kW	Pe kW	Wf m³/h	Dp kPa	
5 °C	180	172,1	40,3	29,6	30,2	162,0	44,7	27,9	27,0	150,9	49,4	26,0	23,7	138,7	54,2	23,9	20,3	125,6	59,3	21,6	16,9	
	230	215,6	50,9	37,1	25,1	202,9	56,6	34,9	22,4	189,1	62,8	32,5	19,7	174,2	69,5	30,0	17,0	158,2	76,8	27,2	14,2	
	280	257,8	61,5	44,4	34,8	242,6	68,3	41,7	31,2	226,3	75,9	38,9	27,4	208,7	84,3	35,9	23,6	190,0	93,5	32,7	19,9	
	330	308,2	72,2	53,0	27,2	289,8	80,1	49,8	24,3	270,0	89,1	46,5	21,3	249,0	99,2	42,8	18,3	226,6	110,3	39,0	15,4	
	380	350,3	82,8	60,3	34,5	329,4	91,8	56,7	30,8	307,1	102,2	52,8	27,0	283,4	113,9	48,8	23,3	258,3	126,9	44,4	19,6	
	450	407,2	97,5	70,1	34,6	383,3	108,1	65,9	30,9	357,4	120,0	61,5	27,1	329,6	133,4	56,7	23,3	299,9	148,1	51,6	19,5	
	510	460,9	110,7	79,3	35,3	433,9	122,8	74,7	31,5	404,9	136,6	69,7	27,6	373,8	152,1	64,3	23,7	340,7	169,2	58,6	19,9	
	570	527,1	124,2	90,7	39,5	495,7	137,8	85,3	35,2	462,2	153,3	79,5	30,8	426,6	170,9	73,4	26,4	388,8	190,4	66,9	22,1	
	650	591,5	143,8	101,8	49,3	556,9	158,7	95,8	43,9	519,5	175,7	89,4	38,4	479,1	194,8	82,4	33,0	436,0	215,9	75,0	27,5	
	720*	655,9	163,6	112,8	60,0	618,1	179,7	106,3	53,6	576,7	198,1	99,2	46,9	531,7	218,7	91,5	40,2	483,1	241,4	83,1	33,5	
	7 °C	180	183,6	40,3	31,6	34,1	172,9	44,9	29,7	30,5	161,1	49,7	27,7	26,8	148,3	54,7	25,5	23,0	134,5	59,9	23,1	19,2
		230	230,2	51,0	39,6	28,3	216,7	56,8	37,3	25,3	202,0	63,0	34,8	22,3	186,3	69,8	32,0	19,2	169,5	77,1	29,2	16,1
280		275,4	61,7	47,4	39,3	259,2	68,5	44,6	35,2	241,9	76,2	41,6	31,0	223,3	84,6	38,4	26,7	203,5	93,8	35,0	22,6	
330		329,4	72,5	56,7	30,8	309,7	80,5	53,3	27,5	288,7	89,4	49,7	24,1	266,4	99,5	45,8	20,8	242,8	110,6	41,8	17,5	
380		374,5	83,2	64,4	39,0	352,2	92,2	60,6	34,8	328,5	102,5	56,5	30,6	303,3	114,2	52,2	26,4	276,8	127,2	47,6	22,3	
450		435,0	97,9	74,8	39,1	409,4	108,4	70,4	34,9	382,0	120,3	65,7	30,7	352,6	133,5	60,7	26,4	321,3	148,2	55,3	22,2	
510		492,5	111,2	84,7	40,0	463,7	123,3	79,8	35,7	432,8	137,0	74,5	31,3	399,9	152,4	68,8	27,0	365,0	169,4	62,8	22,7	
570		563,5	124,8	96,9	44,9	530,0	138,3	91,2	39,9	494,3	153,8	85,0	35,0	456,5	171,3	78,5	30,0	416,6	190,8	71,7	25,2	
650		631,5	144,6	108,6	55,8	594,6	159,4	102,3	49,8	554,8	176,2	95,5	43,6	512,2	195,2	88,1	37,4	466,8	216,2	80,3	31,3	
720*		699,5	164,4	120,3	67,9	659,2	180,4	113,4	60,6	615,4	198,6	105,9	53,2	568,0	219,0	97,7	45,6	517,0	241,5	88,9	38,1	
8 °C		180	189,6	40,3	32,6	36,2	178,6	45,0	30,7	32,4	166,5	49,8	28,6	28,4	153,4	54,9	26,4	24,4	139,2	60,2	24,0	20,4
		230	237,8	51,0	40,9	30,0	223,8	56,8	38,5	26,9	208,8	63,1	35,9	23,6	192,6	70,0	33,1	20,4	175,4	77,3	30,2	17,2
	280	284,5	61,8	49,0	41,7	267,8	68,7	46,1	37,3	250,0	76,3	43,0	32,9	230,9	84,7	39,7	28,4	210,6	94,0	36,2	24,0	
	330	340,4	72,7	58,6	32,7	320,1	80,6	55,1	29,2	298,4	89,6	51,3	25,6	275,5	99,6	47,4	22,1	251,3	110,7	43,2	18,7	
	380	387,1	83,4	66,6	41,5	364,0	92,4	62,6	37,0	339,6	102,7	58,4	32,6	313,7	114,4	54,0	28,1	286,4	127,3	49,3	23,8	
	450	449,3	98,1	77,3	41,5	423,0	108,6	72,8	37,1	394,8	120,4	67,9	32,6	364,6	133,6	62,7	28,1	332,6	148,2	57,2	23,7	
	510	508,9	111,5	87,5	42,6	479,1	123,5	82,4	38,0	447,3	137,2	77,0	33,3	413,5	152,5	71,1	28,7	377,7	169,6	65,0	24,2	
	570	582,4	125,1	100,2	47,8	547,7	138,7	94,2	42,5	511,0	154,1	87,9	37,3	472,1	171,6	81,2	32,0	431,1	191,0	74,2	26,9	
	650	652,2	145,0	112,2	59,4	614,1	159,7	105,7	52,9	573,2	176,5	98,6	46,4	529,5	195,4	91,1	39,9	482,9	216,3	83,1	33,4	
	720*	722,0	164,8	124,2	72,1	680,6	180,7	117,1	64,4	635,5	198,8	109,3	56,5	586,9	219,1	101,0	48,5	534,6	241,6	92,0	40,6	
	10 °C	180	202,0	40,3	34,8	40,7	190,3	45,0	32,7	36,4	177,6	50,0	30,6	32,0	163,8	55,3	28,2	27,6	149,1	60,7	25,6	23,2
		230	253,4	51,1	43,6	33,7	238,6	57,0	41,1	30,2	222,8	63,3	38,3	26,6	205,8	70,2	35,4	23,0	187,7	77,7	32,3	19,5
280		303,4	62,0	52,2	46,9	285,7	68,9	49,1	42,0	266,8	76,6	45,9	37,1	246,7	85,0	42,4	32,1	225,4	94,3	38,8	27,2	
330		363,2	73,1	62,5	36,9	341,6	81,0	58,8	32,9	318,7	89,9	54,8	29,0	294,5	100,0	50,7	25,0	269,1	111,0	46,3	21,2	
380		413,0	83,9	71,1	46,8	388,5	92,9	66,8	41,8	362,7	103,1	62,4	36,8	335,4	114,7	57,7	31,8	306,6	127,7	52,8	27,0	
450		479,1	98,6	82,4	46,8	451,2	109,0	77,6	41,9	421,5	120,7	72,5	36,9	389,7	133,9	67,1	31,9	356,1	148,4	61,3	26,9	
510		542,7	112,1	93,4	48,1	511,1	124,0	87,9	42,9	477,5	137,6	82,2	37,7	441,9	152,9	76,0	32,6	404,3	169,9	69,6	27,5	
570		621,4	125,9	106,9	54,1	584,6	139,3	100,6	48,2	545,7	154,7	93,9	42,2	504,6	172,1	86,8	36,4	461,5	191,5	79,4	30,7	
650		695,0	145,7	119,6	67,0	654,6	160,3	112,6	59,8	611,4	177,0	105,2	52,5	565,4	195,8	97,3	45,2	516,5	216,6	88,9	38,0	
720*		768,6	165,6	132,2	81,3	724,7	181,4	124,7	72,6	677,2	199,3	116,5	63,8	626,1	219,4	107,7	54,9	571,4	241,7	98,3	46,1	
12 °C		180	215,1	40,2	37,0	45,7	202,7	45,1	34,9	40,9	189,3	50,2	32,6	36,1	174,9	55,6	30,1	31,1	159,5	61,2	27,4	26,2
		230	269,8	51,1	46,4	37,8	254,2	57,1	43,7	33,9	237,5	63,5	40,9	29,9	219,7	70,5	37,8	26,0	200,8	78,0	34,5	22,0
	280	323,0	62,2	55,6	52,6	304,3	69,1	52,4	47,2	284,4	76,8	48,9	41,7	263,3	85,3	45,3	36,2	241,0	94,6	41,5	30,8	
	330	387,0	73,4	66,6	41,5	364,2	81,3	62,7	37,1	340,0	90,3	58,5	32,7	314,6	100,3	54,1	28,3	287,9	111,4	49,5	24,0	
	380	440,1	84,4	75,7	52,6	414,2	93,3	71,3	47,0	386,9	103,6	66,6	41,5	358,2	115,1	61,6	35,9	328,0	128,0	56,4	30,5	
	450	510,3	99,0	87,8	52,7	480,9	109,4	82,7	47,2	449,5	121,1	77,3	41,6	416,3	134,1	71,6	36,0	381,1	148,6	65,6	30,5	
	510	578,0	112,7	99,4	54,2	544,6	124,6	93,7	48,4	509,2	138,1	87,6	42,6	471,8	153,3	81,2	36,9	432,3	170,2	74,4	31,3	
	570	662,1	126,7	113,9	61,1	623,2	140,1	107,2	54,4	582,1	155,4	100,1	47,8	538,9	172,7	92,7	41,2	493,6	192,1	84,9	34,9	
	650	739,6	146,6	127,2	75,5	697,0	161,0	119,9	67,4	651,5	177,6	112,1	59,3	603,1	196,2	103,8	51,1	552,0	217,0	95,0	43,2	
	720*	817,1	166,4	140,6	91,3	770,8	182,0	132,6	81,7	720,9	199,8	124,0	71,9	667,3	219,7	114,8	62,0	610,2	241,9	105,0	52,3	
	14 °C	180	228,7	40,0	39,3	51,1	215,7	45,1	37,1	45,9	201,6	50,4	34,7	40,5	186,6	55,9	32,1	35,1	170,5	61,6	29,3	29,7
		230	286,9	51,2	49,4	42,3	270,4	57,2	46,5	38,0	252,9	63,7	43,5	33,6	234,3	70,8	40,3	29,2	214,6	78,4	36,9	24,9
280		343,5	62,5	59,1	58,9	323,8	69,4	55,7	52,9	302,9	77,1	52,1	46,8	280,7	85,7	48,3	40,7	257,4	95,0	44,3	34,7	
330		411,9	73,8	70,9	46,6	387,8	81,7	66,7	41,6	362,4	90,7	62,4	36,7	335,7	100,7	57,8	31,9	307,8	111,8	52,9	27,1	
380		468,3	85,0	80,6	59,0	441,0	93,9	75,9	52,8	412,3	104,1	70,9	46,6	382,1	115,6	65,7	40,5	350,5	128,4	60,3	34,5	
450		542,9	99,5	93,4	59,1	511,9	109,8	88,1	53,0	479,0	121,4	82,4	46,8	444,2	134,4	76,4	40,7	407,4	148,8	70,1	34,6	
510		614,9	113,4	105,8	60,9	579,7	125,2	99,7	54,5	542,4	138,6	93,3	48,0	503,2	153,8	86,6	41,7	461,9	170,6	79,5	35,4	
570		704,6	127,5	121,2	68,8	663,5	140,8	114,2	61,4	620,3	156,1	106,7	54,0	575,0	173,4	98,9	46,7</					

HEATING MODE

MWC		Outdoor air temperature																
		40°C				45°C				50°C				55°C				
		Ph kW	Pe kW	Wf m³/h	Dp kPa	Ph kW	Pe kW	Wf m³/h	Dp kPa	Ph kW	Pe kW	Wf m³/h	Dp kPa	Ph kW	Pe kW	Wf m³/h	Dp kPa	
5 °C	180	202,3	44,9	35,0	40,3	196,3	49,5	34,0	38,3	189,5	54,4	32,9	36,0	182,0	59,6	31,6	33,5	
	230	259,4	56,7	44,9	34,9	251,8	62,7	43,6	33,1	243,5	69,3	42,3	31,3	234,5	76,4	40,8	29,3	
	280	311,8	67,4	54,0	27,6	303,1	74,5	52,6	26,3	294,0	82,3	51,1	24,9	284,4	90,8	49,5	23,5	
	330	370,1	80,0	64,0	37,8	359,3	88,5	62,3	35,9	348,3	98,0	60,5	34,0	336,9	108,6	58,6	32,1	
	380	422,0	91,2	73,0	36,6	410,1	101,0	71,1	34,8	397,9	112,0	69,1	33,0	385,6	124,3	67,1	31,3	
	450	485,2	107,0	83,9	38,5	471,7	118,3	81,8	36,7	457,6	130,8	79,5	34,7	442,9	144,8	77,1	32,8	
	510	544,0	122,7	94,1	44,2	529,6	135,7	91,8	42,2	514,8	150,4	89,4	40,1	499,7	166,7	86,9	38,1	
	570	619,1	138,2	107,0	53,2	602,1	152,9	104,3	50,6	584,8	169,5	101,5	48,1	567,4	188,2	98,7	45,5	
	650	700,2	157,2	121,2	28,7	680,9	173,0	118,1	27,3	660,9	190,8	114,8	25,9	640,0	210,6	111,4	24,5	
	720 (*)	785,6	179,2	135,9	35,5	763,6	196,5	132,4	33,8	740,2	215,8	128,6	32,0	715,3	237,3	124,5	30,2	
	7 °C	180	212,9	45,3	36,8	44,3	206,4	50,0	35,7	42,0	199,0	55,0	34,5	39,4	190,9	60,3	33,2	36,6
		230	273,2	57,2	47,2	38,3	264,8	63,3	45,9	36,3	255,7	70,0	44,4	34,2	246,0	77,2	42,8	32,0
280		328,7	68,0	56,9	30,4	319,0	75,2	55,3	28,8	308,9	83,0	53,7	27,3	298,3	91,6	51,9	25,7	
330		390,3	80,9	67,5	41,7	378,3	89,4	65,5	39,5	365,9	98,9	63,5	37,3	353,3	109,5	61,5	35,1	
380		445,2	92,3	77,0	40,4	431,7	102,0	74,8	38,3	418,1	113,0	72,6	36,2	404,4	125,3	70,4	34,2	
450		511,2	108,1	88,4	42,5	496,1	119,2	86,0	40,3	480,4	131,8	83,4	38,1	464,1	145,6	80,8	35,8	
510		573,3	124,1	99,1	48,8	557,0	137,0	96,5	46,4	540,4	151,6	93,8	44,0	523,4	167,9	91,1	41,6	
570		652,8	139,9	112,8	58,8	633,6	154,5	109,7	55,7	614,2	171,1	106,6	52,7	594,7	189,7	103,4	49,8	
650		737,4	158,9	127,6	31,6	715,8	174,6	124,1	30,0	693,4	192,3	120,5	28,3	670,2	212,0	116,7	26,7	
720 (*)		826,5	181,1	143,0	39,1	802,0	198,2	139,0	37,1	776,0	217,4	134,8	35,0	748,5	238,7	130,3	32,8	
8 °C		180	218,3	45,5	37,7	46,4	211,6	50,3	36,6	44,0	204,0	55,3	35,4	41,3	195,6	60,7	34,0	38,3
		230	280,3	57,5	48,5	40,1	271,5	63,6	47,0	38,0	262,1	70,3	45,5	35,8	252,0	77,6	43,8	33,4
	280	337,3	68,3	58,4	31,9	327,2	75,5	56,7	30,2	316,6	83,4	55,0	28,5	305,5	92,1	53,2	26,8	
	330	400,7	81,3	69,3	43,8	388,1	89,8	67,2	41,4	375,1	99,4	65,1	39,0	361,9	110,0	63,0	36,7	
	380	457,1	92,9	79,1	42,4	443,0	102,5	76,8	40,2	428,6	113,5	74,4	37,9	414,1	125,8	72,1	35,7	
	450	524,6	108,7	90,7	44,6	508,7	119,8	88,2	42,3	492,3	132,3	85,5	39,9	475,2	146,1	82,7	37,4	
	510	588,4	124,8	101,7	51,2	571,3	137,7	99,0	48,6	553,7	152,3	96,1	46,0	535,9	168,5	93,2	43,4	
	570	670,2	140,8	115,8	61,8	649,9	155,4	112,5	58,5	629,5	171,9	109,2	55,3	608,9	190,4	105,9	52,1	
	650	756,6	159,8	130,9	33,1	733,8	175,4	127,2	31,4	710,2	193,0	123,4	29,7	685,9	212,7	119,4	27,9	
	720 (*)	847,6	182,1	146,6	40,9	821,8	199,0	142,4	38,8	794,5	218,2	138,0	36,6	765,8	239,4	133,3	34,3	
	10 °C	180	229,6	45,9	39,7	50,9	222,3	50,8	38,5	48,2	214,3	56,0	37,2	45,2	205,4	61,4	35,7	41,9
		230	295,0	58,0	51,0	44,1	285,5	64,3	49,5	41,7	275,2	71,0	47,8	39,1	264,4	78,3	46,0	36,5
280		355,3	69,1	61,5	35,1	344,2	76,3	59,7	33,2	332,6	84,2	57,8	31,3	320,5	92,9	55,8	29,3	
330		422,3	82,3	73,0	48,2	408,5	90,8	70,8	45,5	394,3	100,4	68,4	42,8	379,8	111,0	66,1	40,1	
380		481,9	94,1	83,3	46,8	466,3	103,7	80,8	44,2	450,5	114,6	78,2	41,6	434,5	126,8	75,6	39,0	
450		552,6	109,9	95,5	49,2	535,1	120,9	92,7	46,5	517,0	133,3	89,8	43,7	498,3	147,0	86,7	40,9	
510		619,7	126,4	107,1	56,5	600,7	139,2	104,0	53,5	581,4	153,7	100,9	50,5	561,7	169,8	97,7	47,5	
570		706,3	142,7	122,0	68,2	683,9	157,2	118,4	64,4	661,3	173,7	114,7	60,7	638,6	192,1	111,0	57,0	
650		796,4	161,7	137,8	36,4	771,2	177,2	133,7	34,5	745,3	194,6	129,5	32,4	718,6	214,1	125,1	30,4	
720 (*)		891,0	184,0	154,1	44,9	862,7	200,8	149,5	42,5	832,9	219,7	144,6	39,9	801,6	240,8	139,5	37,3	
12 °C		180	241,5	46,3	41,7	55,9	233,7	51,3	40,4	52,8	225,0	56,6	39,0	49,4	215,6	62,2	37,5	45,8
		230	310,4	58,6	53,7	48,4	300,1	64,9	52,0	45,6	289,1	71,8	50,2	42,8	277,4	79,1	48,3	39,8
	280	374,1	69,9	64,7	38,6	361,9	77,1	62,7	36,4	349,4	85,0	60,7	34,2	336,3	93,8	58,5	32,0	
	330	444,9	83,3	76,9	53,1	429,8	91,8	74,4	50,0	414,4	101,4	71,9	46,9	398,7	112,0	69,3	43,8	
	380	507,8	95,3	87,8	51,6	490,7	104,9	85,0	48,6	473,4	115,8	82,2	45,6	456,0	127,9	79,3	42,7	
	450	581,8	111,2	100,5	54,2	562,7	122,1	97,5	51,1	543,0	134,4	94,2	47,9	522,7	148,1	90,9	44,8	
	510	652,4	128,1	112,7	62,2	631,6	140,8	109,3	58,8	610,4	155,2	105,9	55,3	588,9	171,2	102,4	51,9	
	570	743,9	144,8	128,4	75,3	719,4	159,2	124,5	70,9	694,7	175,6	120,5	66,6	669,9	193,9	116,4	62,4	
	650	837,8	163,7	144,9	40,1	810,3	179,0	140,4	37,8	782,0	196,4	135,8	35,5	753,0	215,7	131,0	33,2	
	720 (*)	936,2	186,0	161,8	49,3	905,3	202,6	156,8	46,5	873,0	221,4	151,5	43,6	839,2	242,2	146,0	40,6	
	14 °C	180	253,8	46,7	43,8	61,3	245,5	51,8	42,5	57,8	236,3	57,2	41,0	54,1	226,4	62,9	39,3	50,2
		230	326,5	59,2	56,4	53,0	315,4	65,6	54,6	50,0	303,6	72,5	52,7	46,8	291,2	80,0	50,6	43,5
280		393,6	70,7	68,1	42,3	380,5	77,9	65,9	39,9	366,9	85,9	63,7	37,5	352,9	94,7	61,4	35,0	
330		468,6	84,5	80,9	58,4	452,2	92,9	78,3	54,9	435,5	102,4	75,6	51,4	418,5	113,1	72,8	47,9	
380		534,7	96,7	92,4	56,8	516,2	106,2	89,4	53,4	497,5	117,0	86,3	50,0	478,6	129,2	83,2	46,7	
450		612,3	112,6	105,8	59,7	591,6	123,4	102,4	56,1	570,3	135,6	99,0	52,6	548,4	149,2	95,4	49,0	
510		686,5	129,9	118,5	68,5	663,8	142,5	114,9	64,5	640,8	156,8	111,1	60,6	617,5	172,7	107,3	56,7	
570		783,3	147,1	135,2	83,0	756,6	161,4	130,8	78,0	729,8	177,6	126,5	73,2	702,8	195,9	122,1	68,4	
650		880,8	165,9	152,3	44,0	851,0	181,0	147,5	41,4	820,4	198,2	142,5	38,8	789,0	217,4	137,3	36,2	
720 (*)		983,2	188,1	169,9	54,0	949,7	204,5	164,5	50,8	914,8	223,1	158,8	47,5	878,5	243,7	152,8	44,2	

(*) ΔT evaporator = 5K except for
 (*) = 6K
 ΔT condenser: 5K

Ph : Net heating capacity in kW	Pe : Effective absorbed power in cooling mode	Wf : Water flow in m³ per hour	Dp : Water pressure drop in KPa
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MWC 180


MWC 180		
Evaporator		
In1	Water inlet	4"
Out1	Water outlet	4"
Condenser		
In2	Water inlet	4"
Out2	Water outlet	4"
Liquid line		-
Discharge line		-

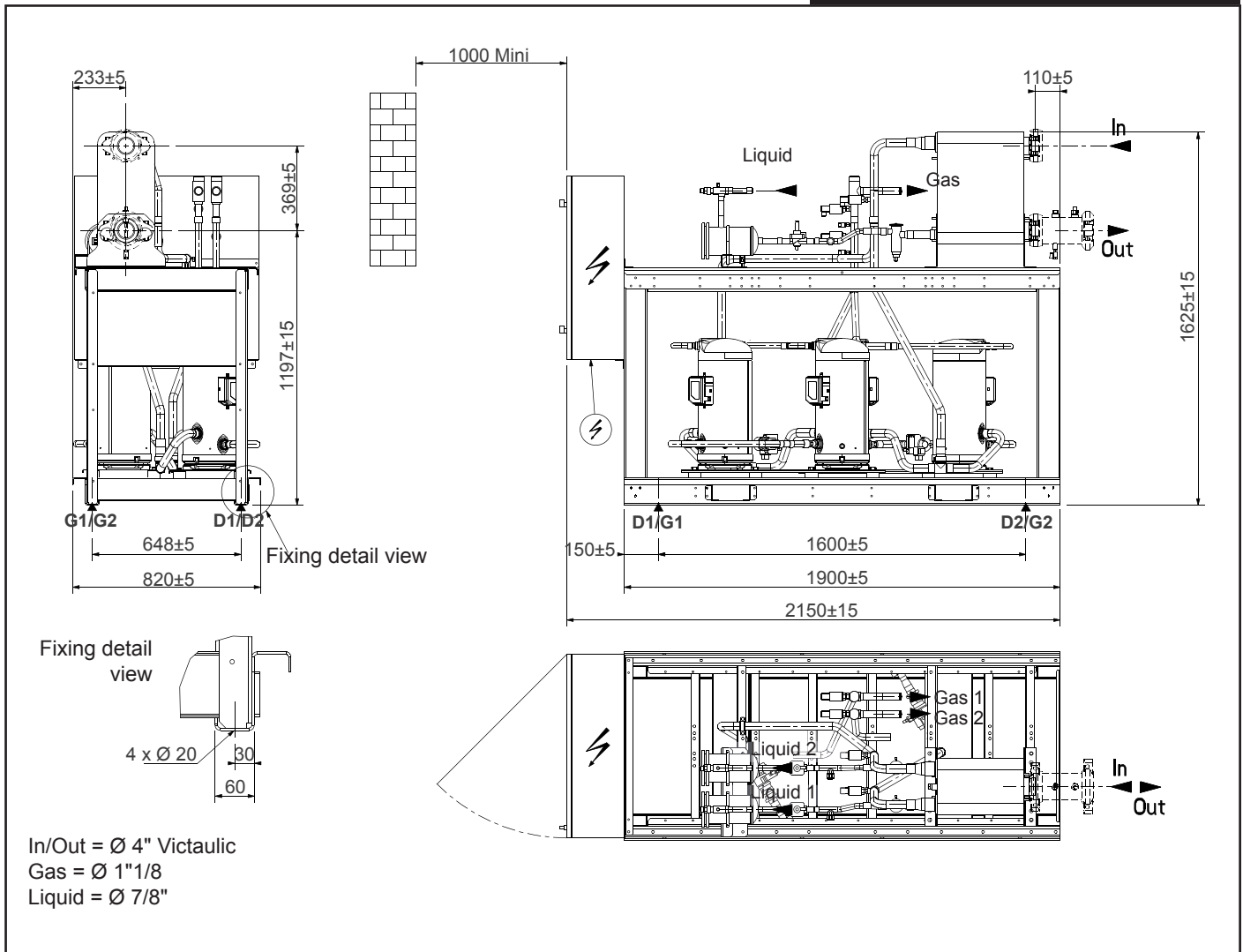
LOAD DISTRIBUTION

(Kg - Operating weights)

MWC 180	
D1	162
D2	162
G1	162
G2	262

Lennox recommend load distribution as detailed above

MRC 180

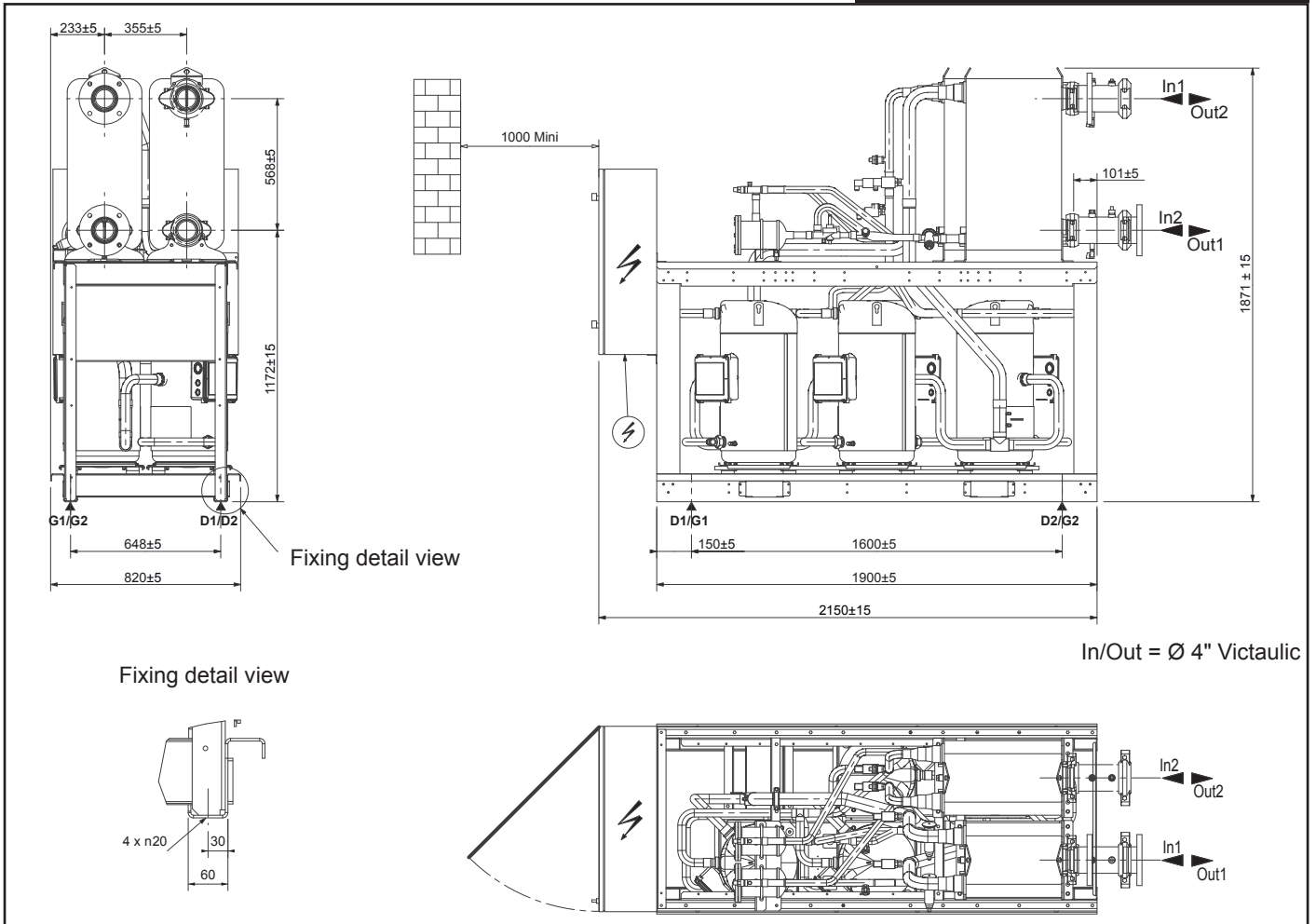


MRC 180		
Evaporator		
In	Water inlet	4"
Out	Water outlet	4"

LOAD DISTRIBUTION
(Kg - Operating weights)

	MRC 180
D1	160
D2	150
G1	140
G2	200

Lennox recommend load distribution as detailed above

MWC 230 → 380


In/Out = Ø 4" Victaulic

			MWC 230 → 380
Evaporator			
In1	Water inlet		4"
Out1	Water outlet		4"
Condenser			
In2	Water inlet		4"
Out2	Water outlet		4"
Liquid line			-
Discharge line			-

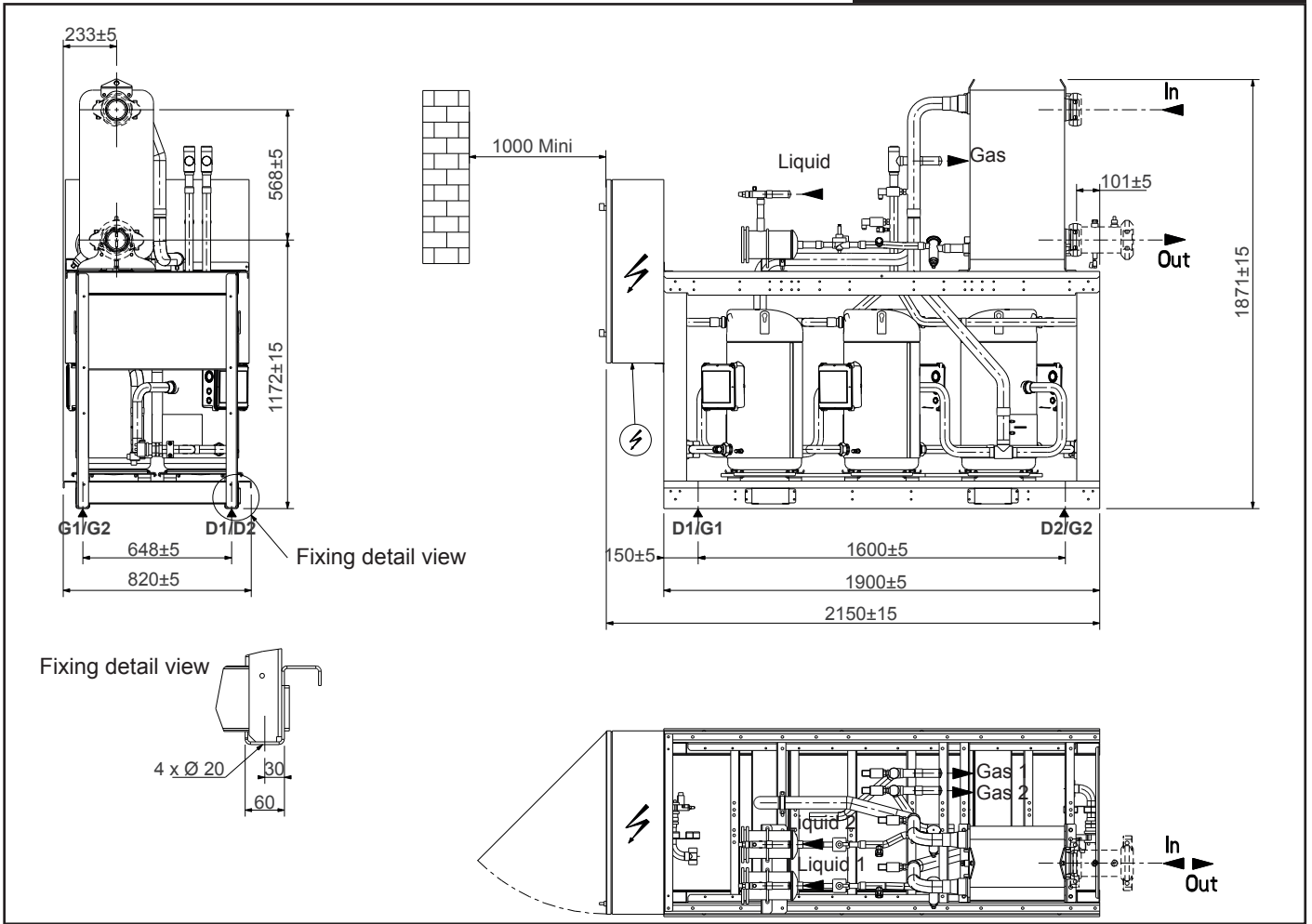
LOAD DISTRIBUTION

(Kg - Operating weights)

	MWC 230	MWC 280	MWC 330	MWC 380
D1	204	237	277	311
D2	214	257	387	441
G1	204	247	277	321
G2	344	417	387	461

Lennox recommend load distribution as detailed above

MRC 230 → 380

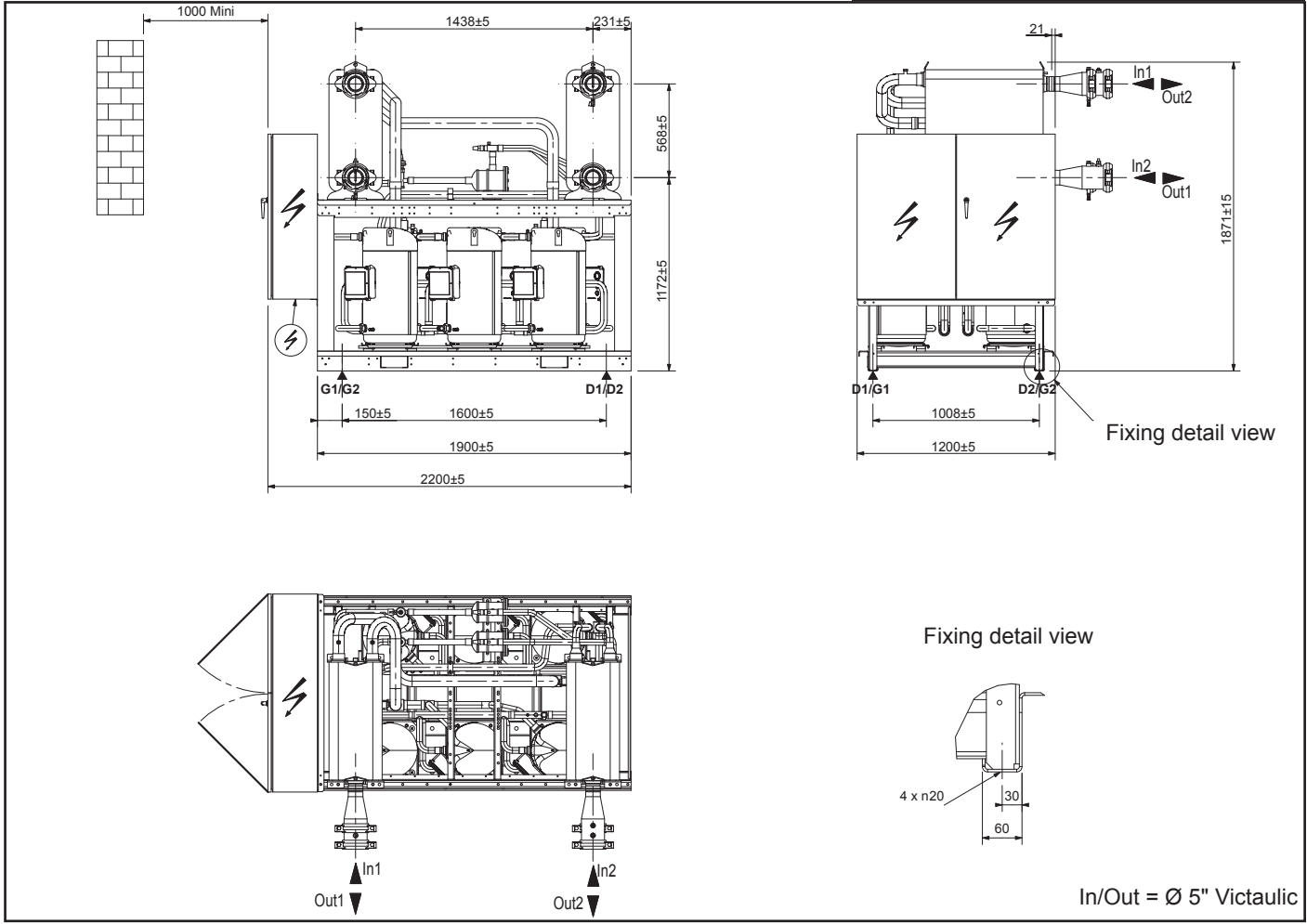


		MRC			
		230	280	330	380
Evaporator					
In	Water inlet	4" Victaulic			
Out	Water outlet				
Ø Liquid 1		1" 1/8			
Ø Liquid 2		7/8"	1" 1/8		
Ø Gas 1		1" 3/8			
Ø Gas 2		1" 1/8	1" 3/8		

LOAD DISTRIBUTION
(Kg - Operating weights)

	MRC 230	MRC 280	MRC 330	MRC 380
D1	200	230	270	270
D2	190	220	350	300
G1	170	210	240	310
G2	250	290	260	410

Lennox recommend load distribution as detailed above

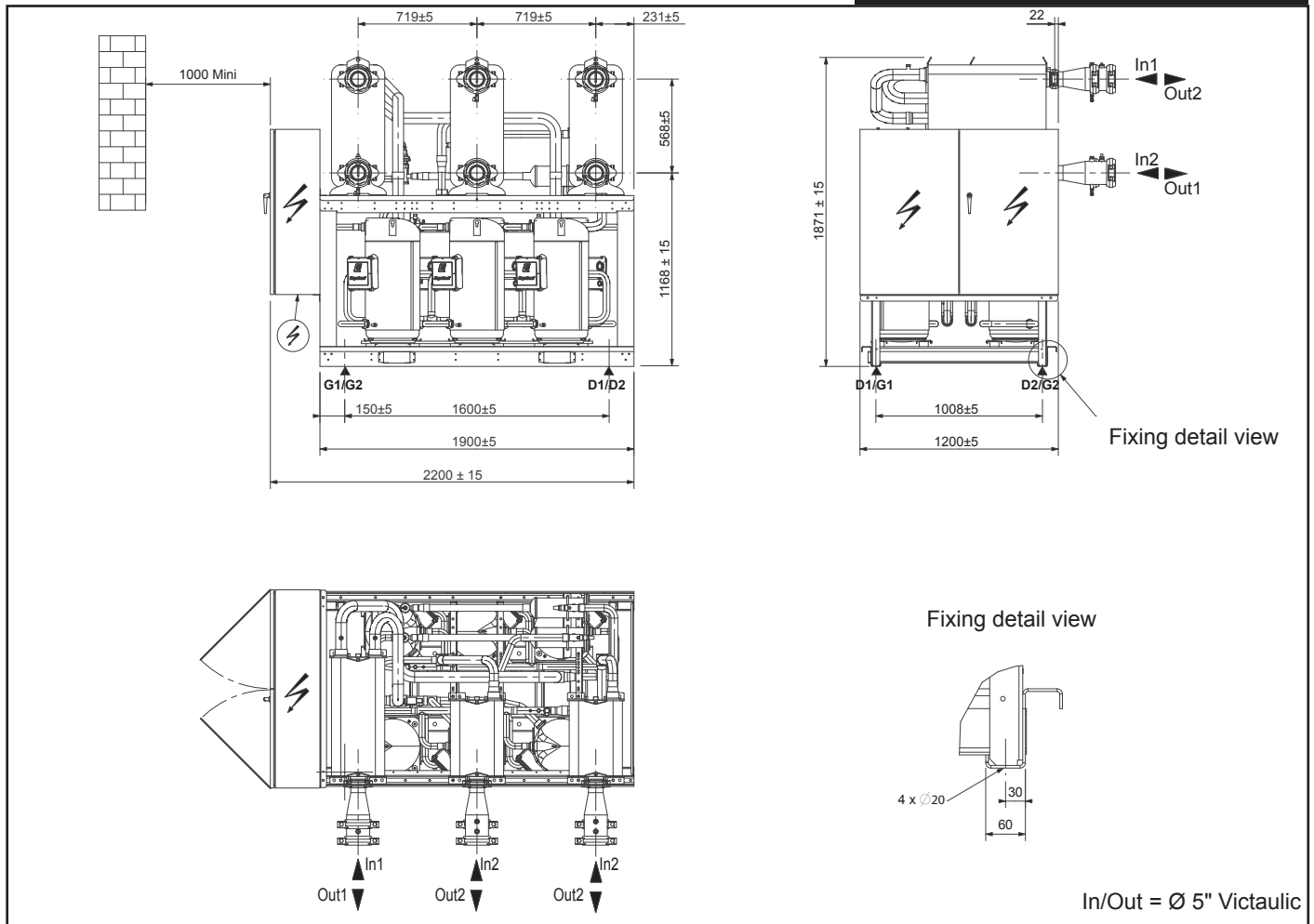
MWC 450 → 570


		MWC 450 → 570	MRC 450 → 570
Evaporator			
In1	Water inlet	5"	5"
Out1	Water outlet	5"	5"
Condenser			
In2	Water inlet	5"	-
Out2	Water outlet	5"	-
Liquid line		-	2 x 1" 3/8
Discharge line		-	2 x 1" 5/8

LOAD DITRIBUTION
 (Kg - Operating weights)

	MWC 450	MWC 510	MWC 570	MRC 450	MRC 510	MRC 570
D1	553	575	645	540	560	630
D2	543	585	605	350	370	380
G1	453	475	515	440	460	500
G2	433	465	475	330	350	360

MWC 650 → 720

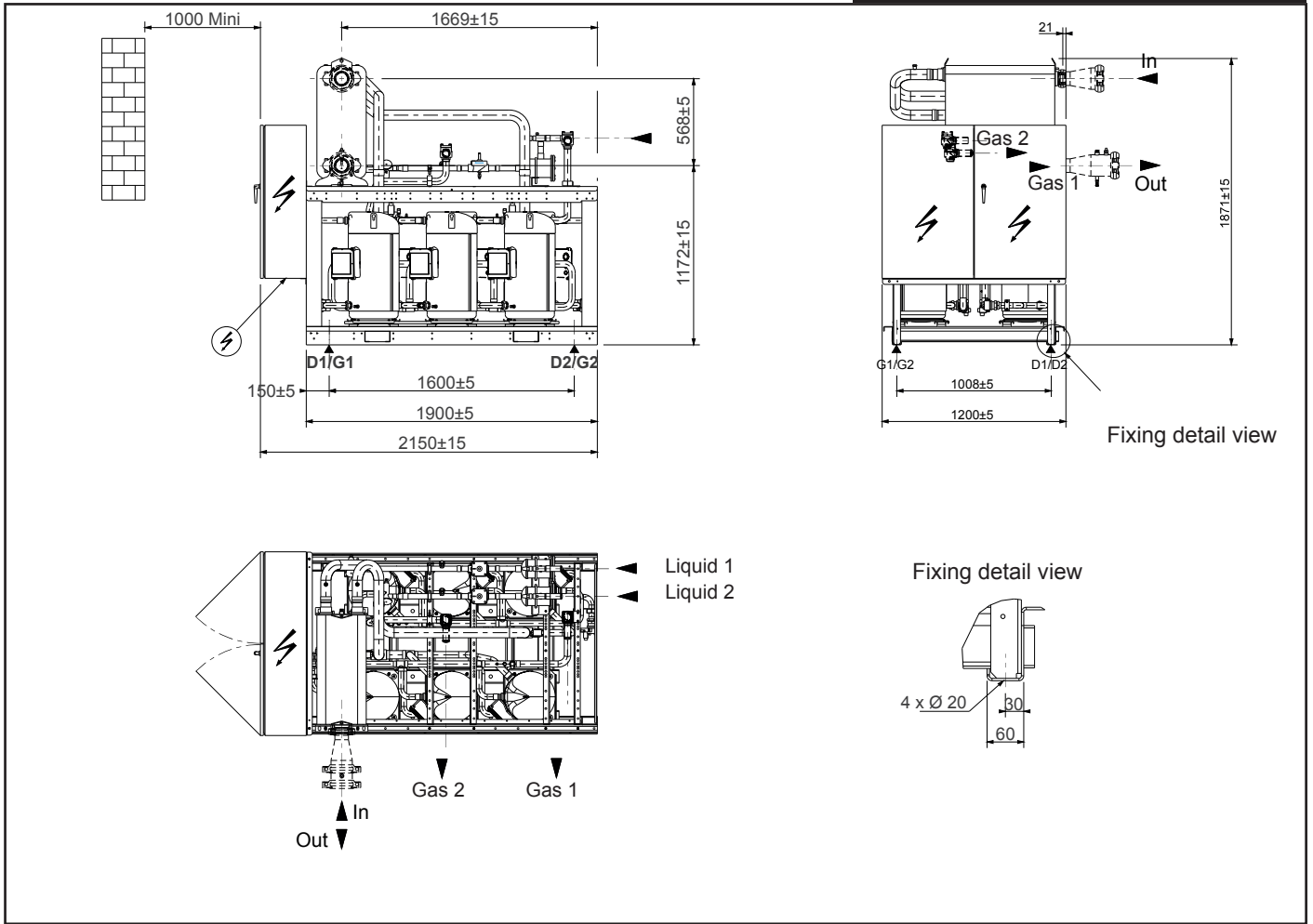


		MWC 650 → 720	MRC 650	MRC 720
Evaporator				
In1	Water inlet	5"	5"	5"
Out1	Water outlet	5"	5"	5"
Condenser				
In2	Water inlet	5"	-	-
Out2	Water outlet	5"	-	-
Liquid line C1 & C2		-	1" 5/8 1" 3/8	2 x 1" 5/8
Discharge line C1 & C2		-	2" 1/8 1" 5/8	2 x 2" 1/8

LOAD DITRIBUTION
(Kg - Operating weights)

	MWC 650	MWC 720	MRC 650	MRC 720
D1	775	785	660	670
D2	655	665	410	420
G1	545	555	530	540
G2	465	475	380	390

MRC 450 → 720



	MRC 450	MRC 510	MRC 570	MRC 650	MRC 720	
Evaporator						
In1	Water inlet					
Out1	Water outlet					
	5" Victaulic					
Ø Liquid 1		1" 3/8		1" 5/8		
Ø Liquid 2		1" 3/8		1" 3/8	1" 5/8	
Ø Gas 1		1" 5/8			2" 1/8	
Ø Gas 2		1" 5/8		1" 5/8	2" 1/8	

LOAD DITRIBUTION
(Kg - Operating weights)

	MRC 450	MRC 510	MRC 570	MRC 650	MRC 720
D1	540	560	630	660	670
D2	350	370	380	410	420
G1	440	460	500	530	540
G2	330	350	360	380	390

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Due to LENNOX EMEA ongoing commitment to quality, the specifications, ratings and dimensions are subject to change without notice and without incurring liability.
Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury.
Installation and service must be performed by a qualified installer and servicing agency.